



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

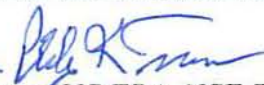
REGION 6

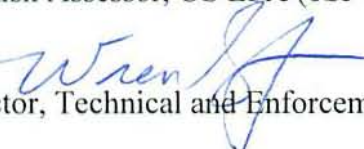
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AUG 20 2008

MEMORANDUM

**SUBJECT:** Trichloroethylene Levels for the Delfasco Forge Site

**FROM:** Philip K. Turner, Ph.D.   
Life Scientist/Risk Assessor, US EPA (6SF-TR)

**THROUGH:** Wren Stenger   
Associate Director, Technical and Enforcement Branch (6SF-T)

**TO:** Delfasco Forge Site File

*Recommendation*

I recommend a concentration of  $14 \mu\text{g}/\text{m}^3$  as the protective level for shorter-term protectiveness and a concentration of  $10 \mu\text{g}/\text{m}^3$  as the protective level for lifetime, chronic exposure (e.g., remedial actions) to trichloroethylene (TCE) in residential indoor air.

*Human Health Risk Assessment*

Based upon EPA's draft Recommended Trichloroethylene (TCE) Toxicity Values to Assess Human Health Risk and Recommendations for the Vapor Intrusion Pathway Analysis dated September 27, 2007 (EPA 2007), human health cancer risk from TCE inhalation through the vapor intrusion pathway was calculated using an inhalation unit risk (IUR) value of  $2.0\text{E}-06 (\mu\text{g}/\text{m}^3)^{-1}$ . This IUR is derived from the geometric mean of the unit risks from four inhalation studies on mice and includes liver cancers, lung cancers, and lymphoma endpoints. Using the latest equations for addressing risks due to inhalation, EPA 2007 recommends the Excess Lifetime Cancer Risk (ELCR) range of  $10^{-6}$  to  $10^{-5}$ . This corresponds to a concentration range between  $1.2$  to  $12 \mu\text{g}/\text{m}^3$ . EPA 2007 also recommends against the  $10^{-4}$  risk level in this case as that value is above where reported non-cancer effects may occur. According to the draft guidance, the current literature on the potential health effects of TCE suggests that the level to protect against non-cancer effects is around  $10 \mu\text{g}/\text{m}^3$ . Therefore, I recommend a range for long-term exposure (e.g., 30 years) to TCE indoor air is  $1.2$  to  $10 \mu\text{g}/\text{m}^3$ . This long-term remediation range can be interpreted to mean that  $1.2 \mu\text{g}/\text{m}^3$  should be used as a preliminary remediation goal, and that any residential indoor air concentration above  $10 \mu\text{g}/\text{m}^3$  due to vapor intrusion needs long-term remediation. The concentration of  $10 \mu\text{g}/\text{m}^3$  is within the ELCR risk range of  $10^{-6}$  to  $10^{-5}$  recommended by EPA 2007.

## Other Considerations

For remediation decisions, EPA 2007 recommends  $10^{-5}$  as the upper end of the risk range under CERCLA actions as opposed to  $10^{-4}$ . In addition, the Texas Commission on Environmental Quality (TCEQ) lists  $14 \mu\text{g}/\text{m}^3$  for addressing ELCR due to inhalation of TCE indoor vapors. TCEQ uses a risk level of  $10^{-5}$  and the same calculations as EPA except they cite a 1997 National Center for Exposure Assessment IUR of  $1.7 \text{ E-}06$ . TCEQ is currently reviewing its risk values for TCE and vapor intrusion, and is considering methods described in EPA 2007.

Health Effect Considered		EPA <sup>1</sup>	TCEQ <sup>2</sup>
Cancer Effects (Excess Lifetime Cancer Risk)	$10^{-4}$	120	
	$10^{-5}$	12	14
	$10^{-6}$	1.2	
Non-cancer Effects (Reference Concentration)		10	

All units as  $\mu\text{g}/\text{m}^3$

<sup>1</sup> EPA. 2007. Draft Guidance on TCE Toxicity Values for Vapor Intrusion Risk Assessment, Internal Review. 2007. The document used an Inhalation Unit Risk Factor (IUR) of  $2.0 \times 10^{-6} (\mu\text{g}/\text{m}^3)^{-1}$  and a Reference Concentration (RfC) of approximately  $10 \mu\text{g}/\text{m}^3$ .

<sup>2</sup> The TCEQ Risk-based Exposure Level (RBEL) is based on a 1997 EPA National Center for Environmental Assessment (NCEA) IUR value of  $1.7 \times 10^{-6} (\mu\text{g}/\text{m}^3)^{-1}$ .

The risk management process may consider the following site-specific factors if indoor air concentrations are found to be outside the range of 1.2 and  $10 \mu\text{g}/\text{m}^3$ :

- Presence of children  $\leq 6$  years old
- Presence of elderly  $\geq 65$  years old
- Costs of mitigation versus those of seasonal monitoring
- Groundwater plume under control and concentrations declining
- Background concentrations
- Heating, Ventilation and Air Conditioning (HVAC) system
- Home/foundation construction (e.g., slab versus pier-and-beam)
- Technical practicality and implementability

## Conclusion

I recommend a range of indoor air concentrations of TCE between 1.2 and  $10 \mu\text{g}/\text{m}^3$  for long-term remediation. The approach used to derive this range followed EPA's draft Recommended Trichloroethylene (TCE) Toxicity Values to Assess Human Health Risk and Recommendations for the Vapor Intrusion Pathway Analysis (EPA 2007).

For purposes of shorter-term protectiveness, an indoor air concentration of  $14 \mu\text{g}/\text{m}^3$  can be recommended. This concentration is approximately a  $10^{-5}$  risk level for long-term exposures and is a concentration that is protective of non-cancer effects for shorter-term exposures (e.g., 14 days to 7 years). Therefore use of this concentration is not inconsistent with the draft guidance (EPA 2007) and is consistent with the TCEQ risk-based exposure level.

cc: Charles Faultry  
Mark Peycke

Attachment



~~Aug~~ 20 2008

## Memorandum

Date August 15, 2008

From Director, DHAC/OD (MS F-59)

Subject TCE levels for the Delfasco Forge Site

To George Pettigrew and Jennifer Lyke, DRO Region 6 (MS F-32)

We agree that the proposed removal and remedial goals for indoor air levels of TCE at the Delfasco Forge Site as stated in the August 13, 2008, DRAFT US EPA Region 6 memo are protective of public health.

William Cibulas Jr., PhD